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AUTHORIZED BY: [signature]

DATE: 5/16/13

Laguna
Construction
Company, Inc.

18 March 1992
Serial Letter #092-080

United States Department of Interior
Bureau of Indian Affairs
Laguna Agency
Laguna, New Mexico 87026

Attention: Ms. Freda Wabnum, Superintendent
Reference: North & South Paguate Dams
Subject: Rehabilitation Activities - Scope Letter

Dear Ms. Wabnum:

The referenced dams are offstream earthen dams located northwest of the Village of Paguate, 50 miles west of Albuquerque, New Mexico, on the Pueblo of Laguna.

We have reviewed the report on the dams compiled by USDOI- Bureau of Reclamation (BOR). The report details the safety evaluations that were made on the dams. The determination is that existing structures pose a "significant hazard potential in terms of loss of life and economic losses in the event of failure", or more specifically, a "Significant Hazard".

A number of recommendations for the safety of the dams were identified during the BOR's examination and will be addressed prior to commencement of any proposed rehabilitation activities and water storage.

The main concern is in the area of the embankment, particularly as various degrees of longitudinal cracking and subsidence have occurred.

The following recommendations were taken from the report and are detailed as the primary areas to review in establishing the safety of the dams and scope of work to rehabilitate them.

A. Determine whether flows from the unlined spillway at the South Dam would endanger the embankment from erosion.

B. Evaluate the cause of longitudinal cracking and sinkholes observed at the Paguate Dams. Perform static, and if necessary, dynamic stability analysis of both embankments to determine whether it is safe to store water behind these dams.

C. Determine an appropriate inflow design flood for the

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Paguate Dams, and route the floods through the reservoirs. Include the effect of the small impoundment located one-fourth mile west of the dams.

D. Perform seismic evaluation of the Paguate Dams.

E. Install measurement pins along the crest of the dams to monitor continued crest settlement yearly to provide baseline data, then every 5 years, or more frequently as observed changes warrant.

There are a number of "Operation and Maintenance" items and "Emergency Action Plans" that will be addressed prior to filling the dams.In addition, we will have hydrologic and seismotectonic studies performed, all in conformance with Attachment I. "Bureau Programs To Be Performed", using guidelines and recommended procedures established by the BOR and BIA Safety of Dams groups. Meetings will be held between BOR, BIA and Pueblo of Laguna, prior to initiating these studies to define approach, procedures and required information to be obtained.

In view of the foregoing we propose to proceed on this project in the following way. We will perform all activities in phases as detailed below.

A. PHASE ONE - TECHNICAL

1. One auger boring will be performed at the maximum section of each embankment. Depending on materials encountered, additional borings may be added. Alternating intervals of Standard Penetration Testing (SPT) and undisturbed sampling will be done.

2. Backhoe testpits will be excavated at the embankments, toe of embankments and in potential borrow areas. Several locations in the reservoir areas, and the upstream and downstream toes of the embankments will be selected.

3. The test pit soils will be logged according to the "Unified Soils Classification System" and disturbed samples of the various materials will be obtained for standard properties testing and in-place moisture content determinations will be made in each test pit at several locations if feasible, depending on the sizes of materials encountered.

4. Standard properties and other testing on test pit samples will include gradation analysis, Atterberg

limits, moisture content and compaction tests to represent the range of material types encountered. Compaction tests will be run on materials anticipated for use as borrow.

5. The following laboratory testing will be performed:

   a. Direct Shear Testing on selected undisturbed samples to represent the range of material types encountered.

   b. Moisture Contents on SPT, undisturbed and test pit samples.

   c. Gradation Analysis on selected SPT and test pit samples.

   d. Atterberg Limits on selected SPT, undisturbed, and test pit samples.

   e. Compaction Tests on selected test pit samples that may be considered for borrow materials.

If there are any indications that the embankments, foundations, or potential borrow materials are highly erosive, tests will be run to determine if they are dispersive (crumb and pinhole tests).

6. All associated hydrologic and seismotectonic studies will be performed as required by qualified personnel in these areas of expertise. We herewith request the BOR"s recommended procedures for performing hydrologic studies and a date to meet with BOR and BIA personnel to describe the approach to seismotectonic studies as discussed previously in this letter.

7. A Seepage Analysis will be done at the dams.

8. We will compile all reports logs, graphics, designs, drawings, recommendations and conclusions.

9. A scope of work will be developed to specifically define what work will be performed on the dams.

All studies that are done to the North Dam are being done to the South Dam. This is in the interest of cost effectiveness, the fact that the North Dam and South Dam act together regarding water storage, and the planned overflow channel will integrate the dams, so the inflows (particularly high inflow) will pass through the dams to a south overflow.

PHASE TWO - CONSTRUCTION REHABILITATION & UPGRADES

This will involve all construction activities associated with rehabilitation, upgrades, removal and replace outlet works, repair and buildup embankment, overflow channel, improve inlet and outlet structures, access platforms, crest and base reconstruction, slope protection, freeboard protection, testing, remove vegetation on the crest and upstream and downstream faces of the dam, install rip rap at outlet and overflow areas, installation of pins and benchmarks along the dam crest for monitoring any potential settlement, and following the cracks and subsided areas to there origin or end so that those areas will be eliminated as a potential weak point in the structure.

PHASE THREE - COMMISSIONING

This will involve development of "Standing Operating Procedures" (SOP), EMERGENCY ACTION PLANS (EAP)", and actually receiving water and turning over the operating system to operating personnel. This will follow training in all areas pertaining to the operation and maintenance of the dams as relates to SOP and EAP requirements. The mutually accepted procedures regarding these important ongoing activities will be written and instructed based on previously accepted and utilized plans, as well as specific circumstances relating to these dams that may not be part of any previously established guide. As a part of this phase we will provide training, operating manuals, instruction books, logbooks in weathertight enclosures, communications methods and instructions, and three, two-way radios.

The overall condition of the dam components are not known at this time, therefore, the scope detailed herein may not be totally complete, however, all work associated with bringing the dam up to acceptable operating levels of safety will be performed as they are defined, irrespective of what phase we are in.

All work discussed previously in this letter, falls under the "Safety of Dams" funding and criteria. There is a diversion structure approximately .4 miles west of the North Dam and another above this structure approximately 1.5 miles in the Paguate River. These structures will be evaluated and upgraded at the same time as the dams, but under other funding (ie. ERFO). It is setforth herein as it is an integral part of the entire system.

The approach to these areas will be the same as the work on the dams (ie. in phases - technical, construction and commissioning). The upper structure diverts water from the Paguate River into a buried concrete pipeline, or allows it to continue down it's normal course to the lower structure, where it can be diverted to the dams

via a slide gate and an open ditch. Both structures require various upgrades including repair and replacement of gates, structure work, and excavation behind the diversion area. Other work will be defined as further investigations of the gates and structure are conducted.

Please find attached the following:

1. Summary of Preliminary Costs (these costs will be adjusted up or down as more knowledge is gained from the investigations and testing, as well as thorough review of existing structures, channels, etc.).

2. Preliminary Schedule (based on Item #1).

3. Notes to Item #1 & #2.

4. Diversion Ditches & Structure (costs & schedule).

In order to keep the work to be performed on the diversion ditches and structures, which will be paid for by a previously assigned ERFO contract we will detail them seperately, but in the same way as the phases to be performed under "Safety of Dams" funds.

Very truly yours,
LAGUNA CONSTRUCTION COMPANY, INC.

Neal D. Kasper
President & General Manager

cc. Governor Harry D. Early, POL
James H. Olsen, Jr., POL
Atiq A. Tatari, LCC

Attachments: As stated above in items 1-4.

PAGUATE DAMS
1. Summary of Preliminary Costs

PHASE ONE - TECHNICAL

A.	Site Review	$ 18,000
B.	Soil Borings	$ 11,000
C.	Investigations, Sampling & Field Testing	$ 27,500
D.	Laboratory Testing & Analysis	$ 9,600
E.	Compile reports, logs, design, drawings, conslusions and recommendations (deliverables).	$ 33,650
	Phase One - Subtotal	$ 99,750

PHASE TWO - CONSTRUCTION & REHABILITATION

A.	Remove, repair & fill embankment, cleanup & shape crest & dam faces, construct overflow channel, rebuild inlet & outlet works (fill), place rip rap.	$325,000
B.	Access platform, slope protection, monitoring pins, freeboard protection, inlet & outlet works reconstruction, inspections & testing.	$120,000
	Phase two - Subtotal	$445,000

PHASE THREE - COMMISSIONING

A.	Standing Operating Procedures (SOP)	$ 6,000
B.	Emergency Action Plan (EAP)	$ 6,000
C.	Training and Operation	$ 7,500
D.	Operating Personnel takeover	$ 5,000
	Phase three - Subtotal	$ 24,500
	GRAND TOTAL.....	$569,250

2. PRELIMINARY SCHEDULE
(Begins when notice-to-proceed is issued)

Phase One - Technical

A. Site Review >
*A1. Meetings with BOR, BIA, POL-hyd & seis.
B. Soil Borings -- 2 Weeks
C. Investigations, Sampling & Field Testing>

D. Laboratory Testing & Analysis >
E. Compile reports, logs design, drawings, conclusions and recommendations (deliverables). -- 3 Weeks >

* Depending on how long it takes to get direction in this area it could extend the overall schedule.

PHASE TWO - CONSTRUCTION & REHABILITATION

A. Remove, repair & fill embankment, cleanup & shape crest & dam faces, construct overflow channel, rebuild inlet & outlet works (fill), place rip rap. > -- 10 Weeks >

B. Access platform, slope protection, monitoring pins, freeboard protection, inlet & outlet works reconstruction, inspections & testing. > -- Concurrent w/ Phase Two, A. >

B1. BEGIN TAKING WATER AT THIS TIME.....

PHASE THREE - COMMISSIONING

A. Standing Operating Procedures >-- Concurrent w/
B. Emergency Action Plans >Activities above

C. Training and Operation >-- 2 Weeks
D. Operating Personnel takeover >

PRELIMINARY SCHEDULE---------->-- 17 WEEKS

PAGUATE DAMS

3. NOTES TO ITEMS #1 & #2

1. Assumes that the majority of the embankment is in tact and removal will be required at the crest and at outlet structure only. Other areas will require fill to strengthen the section.

2. All analysis, management, supervision, equipment, labor, materials, coordination, training, documentation and recordkeeping will be performed by qualified personnel.

3. All testing, design, engineering, and recommendations will be provided by qualified personnel certified to provide professional services in the technical areas we require.

4. Items of work not stated herein, that are required to be performed to complete this project will be paid for as though it had been included. Good faith effort will be made to foresee any items of this type as the technical and construction phases proceed.

4. DIVERSION DITCHES & STRUCTURES

		* Schedule	$
A.	Site Investigation . . . . . >		
B.	Review & Analysis	2 Weeks	$22,100
C.	Conclusions, Recommendations & Drawings . . . . . >		
D.	Rehabilitate Diversions . . . . . .>		
E.	Replace & Repair Gates	4 Weeks	$120,000
F.	Rechannel & Clean Ditches		
G.	Install Piping (diversion to dams). .>		
H.	Develop Standard Operating Procedures>		
I.	Develop Emergency Action Plan	1 Week	$7,900
J.	Training & Operation		
K.	Operating Personnel takeover . . . . >		
	Total----	7 Weeks	$150,000

* All work stated in this schedule will be performed concurrent with work on the dams.